Amendments to the Drawings

FIG. 2 has been amended. The indicator line has been moved to more clearly show that element 106 is a green subpixel and not the black square located in the upper left hand corner of the subpixel.

ATTACHMENT: Replacement Sheet showing FIG. 2

REMARKS

Reconsideration of the objection and rejections set forth in the Office action dated 05/04/2006 is respectfully requested in view of the following remarks.

Amendments to the Specification

Amendments to the specification have been made to provide missing application numbers for the related applications in paragraph [02], and to provide the patent application publication and issued patent numbers of the applications referenced in paragraphs [03] and [04]. References to two of those applications have been updated in paragraph [017]. The reference to "pixels" has been changed to "subpixels" in paragraph [020]. This is consistent with the last line in paragraph [019]. It is believed that these amendments do not add new matter to the application.

Amendments to the Claims

Claims 1 - 21 were pending prior to entry of this amendment.

Claims 1, 6, 8, 10, 13, 15, 17, 18, 20 and 21 have been amended. In claims 1, 6, 8, 13, 15 and 20, the phrase "image data and polarity signals" has been amended to address the Section 112 rejection to the claims as discussed further below. Amendments to certain ones of the other claims have been made to address the objections to the claims as discussed further below.

The amendments to some of the claims are broadening amendments submitted to more fully claim that which is applicant's invention, and are not intended to limit or narrow the scope of the claims or to effect the Doctrine of Equivalents as it might be applied to the claims, were they unamended. Moreover, apart from the amendments made to address the Section 112 rejections, claim amendments made herein are NOT being made as a requirement for patentability over the cited art of record. As noted below, Applicants believe that the Office Action fails to state a

prima facie case of obviousness under 35 U.S.C. 103(a) as to any combination of the recited references against any of the claims.

The subject application is a continuation-in-part application of U.S. 10/456,839, (the '839 application, Attorney Docket No. 8831.0056) filed on June 6, 2003. Applicants received a three-way restriction requirement in the '839 application. Applicants believe that claims 10 – 15 originally filed in the '839 application (designated as Group III in the restriction requirement) are more appropriately presented in the subject application, and so have amended claim 6 herein and have added new dependent claims 22 – 26.

New independent claim 27 directed to a method has been added. Support for this claim may be found in the specification at, for example, paragraphs [020] thru [024]. None of the subject matter in either the amendments to the claims or the newly-added claims is intended to add new matter to the application.

Upon entry of this amendment, claims 1 – 27 will be currently pending.

Amendments to the Drawings

FIG. 2 has been amended so that the arrow for element 106 points to the subpixel area and not to the black square located at the upper left hand corner of the subpixel.

Related Applications and Information Disclosure Statement

An Information Disclosure Statement (IDS) is being filed concurrently with this Reply. Applicants direct the Examiner's attention to the following co-owned and copending applications, as recited in paragraph [02] of the specification:

Application Number	Examiner	Art Unit	Attorney Docket No.	Current Status
10/455,925	XIAO, Ke	2629	8831.0050	Final Office Action Mailed
10/455,931	LAO, Lun Yi	2629	8831.0051	NF Office Action Mailed
10/455,927	OSORIO, Ricardo	2629	8831.0052	Response to NF OA Filed
10/456,806	AMADIZ, Ricardo	2629	8831.0053	Final Office Action Mailed
10/456,838	XIAO, Ke	2629	8831.0054	NF Office Action Mailed

(NF indicates "Non-Final" and OA indicates "Office Action."

These applications may include subject matter that is related to the subject matter in the instant application. Applicants have cited the patent application publication documents for each of these applications in the accompanying IDS. Applicants have also cited the substantive Office Actions and Responses in each of these applications on the attached SB/08B forms.

Applicants have further cited, in the accompanying IDS, the primary references that were cited in rejections made under 35 U.S.C. §§ 102 and 103 in each of the Office Actions in these related cases. As a courtesy to the Examiner, these references are also separately listed in the letter accompanying the IDS.

As noted above, the subject application is a continuation-in-part application of U.S. 10/456,839, (the '839 application, Attorney Docket No. 8831.0056) filed on June 6, 2003. The undersigned has cited and provided a copy of the Office Action and Reply in that application and has cited U.S. Patent Application Publication 2004/0246280, the published version of that application, in the IDS filed concurrently with this Reply. As noted on the accompanying IDS, no other copies of foreign patent references or non-patent literature cited on the accompanying IDS have been provided because those copies were provided in the Information Disclosure Statements filed in the parent '839 application, per 37 CFR 1.98(d)(1) and (2).

Claim Objections

Claims **1** and **10** are objected to because of the following informalities: "the said signals" disclosed in claim 1 and "read and green subpixels" disclosed in claim 10.

Applicant has made appropriate amendments to claims 1, 10 and 17. In view of these amendments, Applicant respectfully submits that the objections to the claims have been overcome.

Claim Rejection under 35 U.S.C. § 112

Claims **1, 6, 8, 13,** and **15** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner states that the limitation disclosed in the claims, "image data and polarity signals" is indefinite since it can be interpreted as either "image data and polarity signals" or "image data signals having polarities".

The claims have been amended to use the term "image data having a polarity scheme." The term "polarity scheme" is supported by the specification at, for example, paragraphs [015] and [016]. In view of the amendments to the claims and the foregoing remarks, Applicant respectfully submits that the above rejection has been overcome.

Claim Rejections under 35 U.S.C. § 103(a)

Claims **1, 2, 6, 8, 9, 13, 15, 16,** and **20** have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 6,326,981) in view of Okuzono et al. (US 6,727,878).

Teachings of the Mori reference: Claims 1, 8 and 15.

It is respectfully submitted that the Office Action fails to state a *prima facie* case of obviousness with respect to claims 1, 8 and 15 because (1) the recited combination of Mori and Okuzono fails to teach every claim limitation in these claims, (2) because the Okuzono reference provides no relevant teaching, and (3) the Office Action fails to show where a reasonable motivation, suggestion, or teaching is found for making the asserted combination.

As to claim 1, the Examiner states that "Mori teaches a liquid crystal display [abstract] comprising: a panel [Drawing 1 at page 5 of the Office Action, which is equivalent to Mori's fig. 15] substantially comprising a subpixel repeating group (the subpixels included in a rectangular box with solid lines shown in drawing 1) comprising an even number of subpixels in a row, ..."

Applicant has reviewed Mori's disclosure and respectfully disagrees with the Examiner's interpretation of the claim limitation of "a repeating subpixel group comprising an even number of subpixels in a row" as found in Mori's FIG 15. Mori states "A subpixel pattern including **three columns** as a unit as shown in FIG. 15 is adopted,..." (Col 15 lines 62-69 and col. 16 lines 1-7) (emphasis added). It is clear from this description and the layout shown in FIG. 15 (reproduced below) that the repeating group consists of <u>three</u> subpixels in a row. The repeating group consists of first a row consisting of G-B-G and a second row consisting of R-B-R. The repeating groups in FIG. 15 of Mori, therefore, have an ODD number of subpixels in a row (G-B-G or R-B-R).
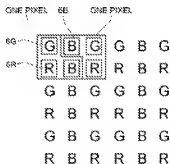

FIG. 15

Also, if one were to use the group of subpixels circled by the Examiner as shown in his Drawing 1, then the subpixel <u>repeating</u> group of the first row should be BGGB, which, when <u>repeated</u> across the row produces subpixels having the arrangement BGGBBGGBBGGB. However, when one looks at the next (fifth) subpixel in the row it is found to be a green (G) subpixel, and not a blue (B) subpixel. Thus, the Examiner's proposed interpretation of FIG. 15 as teaching a subpixel repeating group having an even number of subpixels is not the subpixel repeating group actually shown in a row of subpixels in FIG. 15.

Mori, however, does teach a panel substantially comprising what appears to be a subpixel repeating group comprising an even number of subpixels in a row, in FIGS. 5A and 5B, FIGS. 7A and 7B, FIGS. 9A and 9B, and FIGS. 12 and 13. FIG. 12, which shows repeating groups RG and GB (2 subpixels) in a row, is reproduced below.
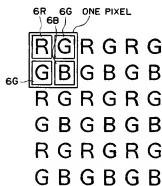

FIG. 12

The Examiner has interpreted the column of blue subpixels in Mori's FIG. 15 (shown in dotted lines in Drawing 1 in the Office Action) as teaching the language in claim 1 reading "said subpixel repeating group further comprising a column of dark colored subpixels." This is consistent with the teaching in Mori in the discussion accompanying FIGS. 20A, 20B and 20C where Mori labels a column of blue subpixels as being dark subpixels because of relative luminance values. See the discussion of these figures in Mori at cols. 14 and 15. However, neither FIG. 12 nor FIG. 13 in Mori shows a column of dark colored subpixels as this language is interpreted by Mori.

With respect to independent method claim 8, the arranging step requires arranging subpixels in a subpixel repeating group of a panel comprising an even number of subpixels in a row, said subpixel repeating group further comprising a column of dark colored subpixels. For the reasons stated above with respect to claim 1, Applicant respectfully submits that Mori does not teach these claim limitations.

With respect to independent apparatus claim 15, the first element of a display panel includes a plurality of subpixels arranged in a subpixel repeating group, said subpixel repeating group comprising an even number of subpixels in a row, and including a column of dark colored subpixels. For the reasons stated above with respect to claim 1, Applicant respectfully submits that Mori does not teach these claim limitations.

The Office Action does not cite the Okuzono reference for any teaching regarding subpixels in a subpixel repeating group having an even number of subpixels in a row, or for any teaching that the subpixel repeating group comprises a column of dark colored subpixels. Applicants respectfully submit that it appears that no such teaching is found in Okuzono. Therefore, for the reasons enumerated above with respect to claims 1, 8 and 15, the recited combination of Mori and Okuzono fails to teach this claim limitation in each of these claims, and the Office Action fails to state a *prima facie* case of obviousness. It is respectfully submitted that claims 1, 8 and 15 are patentable over the combination of Mori and Okuzono, and are believed to be in condition for allowance. With respect to claims 2 – 5, 9 – 12 and 16 – 19, these claims depend from now presumably allowed claims 1, 8 and 15, and are also believed to be in condition for allowance.

<u>Teachings of the Okuzono reference.</u>

The Abstract in the Okuzono reference provides a succinct explanation of the problem being addressed and a proposed solution to that problem:

A liquid crystal display is provided which has low power consumption, and which prevents horizontal stripes from occurring without the circuitry becoming more complex. When the write voltage polarity is inverted every plurality of lines, in the n line where the polarity is inverted, the rise in the drain line waveform dulls due to the charging of the drain line. In the n+1 line, because the drain line has been charged by the writing of the n line, waveform dullness does not occur. A difference between the write states in the two lines causes horizontal stripes. Consequently, the output enable signal is activated at the rise of the clock signal, and the gate line is activated after a predetermined time to start the writing. Therefore, writing is not performed during the period of waveform dullness, and the write state is the same across all scan lines.

Okuzono, Abstract. *See also* the discussion at col 3, lines 36 – 60. Okuzono discloses that "… the write states for the liquid crystal cells can be made constant for all scan lines. Consequently horizontal stripes caused by the difference in brightness between the scan lines no longer occur, and the display grade improves." (Okuzono, col. 4, lines 64 – 67.)

Okuzono is cited in the Office Action for its teaching of a liquid crystal display that is driven with data signals having specific polarities. For example, various figures illustrate timing charts showing the operation of a liquid crystal display according to different embodiments of polarity schemes such as two line dot inversion (e.g., FIGS. 3, 5, 7 and 10) and three line dot inversion (e.g., FIGS. 6 and 8.) In each example, Okuzono refers to the solution proposed for causing horizontal stripes on the display, which are caused by polarity inversion applied to the pixels, to disappear. See, for example, the discussion at col. 9, lines 55 – 65, col. 11, lines 11 – 28, col. 12, lines 40 – 50 and col. 13, lines 21 – 45.

The asserted combination of Mori and Okuzono does not teach the invention as claimed.

Applicants have discussed above that Mori does not teach a subpixel repeating group having an even number of subpixels in a row and including a column of dark colored subpixels. However, it is useful to discuss the asserted combination of Mori and Okuzono in order to illustrate that the teachings of the Okuzono reference are not relevant with respect to independent claims 1, 8 and 15 in the subject application.

The Office Action states that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to drive Mori's display (presumably with a subpixel layout as illustrated in FIG. 15 therein) with image data having the polarities taught by Okuzono, to mask the dull portions of the voltage waveform of the data lines." (Office Action, page 3.) This assertion seems to suggest that the display taught in Mori would benefit from the timing technique taught in Okuzono. This may or may not be true, but this asserted combination only teaches that, if the display in Mori suffers from horizontal striping, the technique in Okuzono may cure this problem.

The Office Action acknowledges that Mori modified by Okuzono does not expressly disclose any image degradation of said signals being localized on a column of dark colored subpixels, as required in claim 1. (Office Action, page 4.) But the Office Action further states that

> by adopting Okuzono's method of applying polarities to the subpixels in Mori, the signals with the same polarity are applied to adjacent blue subpixels included in a column, as shown in drawing 2. Since two adjacent blue subpixels are driven with a same polarity, the image (de)gradation only occurs on the blue subpixels while the image (de)gradation does not occur on any other subpixels having different colors (i.e. red or green) since red or green subpixels are not adjacent

to the subpixels having same colors when they are driven with a same polarity.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to [disclose] (have) any image (de)gradation (caused by driving two adjacent subpixels having a same color with a same polarity) in driving signals to be localized on a column of dark colored subpixels (blue subpixels), in Mori as modified by Okuzono.

Applicants respectfully submit that there are four problems with this analysis of the asserted combination of Mori as modified by Okuzono. First, independent claims 1, 8 and 15 in the subject application refer to any image degradation introduced by image data signals being localized to a column of dark colored subpixels. Okuzono is clearly concerned with, and explicitly teaches, improving display quality by _eliminating_ horizontal striping that may occur as a result of applying a polarity scheme. Thus, if one were to interpret horizontal striping as being a type of "image degradation" for the sake of argument herein, then Applicant respectfully submits that Okuzono _explicitly teaches away_ from localizing image degradation: Okuzono is concerned with _eliminating_ image degradation (i.e., horizontal striping.) Thus, the timing technique combined with the various polarity schemes taught in Okuzono do not teach a person of ordinary skill in the art how to localize image degradation.

Secondly, the Office Action refers to drawing 2 which shows a polarity scheme applied to the subpixels in FIG. 15 of Mori. The polarity scheme appears to be 1 x 2 dot inversion (the polarity of each subpixel in each column is inverted from the adjacent subpixel, with every two rows having the same polarity pattern across the subpixels in the row), referred to in Okuzono as "two line dot inversion". See Ozukono, FIG. 2 and col. 7, line 64 to col. 8, line 9.

This appears to be an inconsistency in the Examiner's argument. First, Okuzono provides no teaching as to any other subpixel arrangement in the LCD displays discussed therein except the standard RBG stripe display.

> [T]he liquid crystal panel 1 comprises two oppositely disposed glass substrates, with the liquid crystal being filled between these glass substrates. On one of the glass substrates the TFTs 4 are arranged and the gate lines 2n and the drain lines 3 are also provided. Furthermore, a filter and the common electrode 6 are placed on the other glass substrate, and if the liquid crystal display is a color liquid crystal display, then a color filter *for the three primary colors RGB is provided as the filter.* In the present specification, discussion will continue based on the assumption that the liquid crystal panel 1 conforms to SXGA (Super eXtended Graphics Array) standard resolution (1280 dots times1024 dots) with a frame frequency of 60 Hz. *For each RGB color* there will therefore be 1280 drain lines 3 and 1024 gate lines.

Okuzono at col. 6, line 66 to col. 7, line 12 (emphasis added.) Thus, the dot inversion schemes discussed in Okuzono appear to be relevant to a standard RGB stripe display, and not to the alternative subpixel configurations disclosed in Mori.

Moreover, Applicants' own specification acknowledges that 1 x 2 dot inversion is well known in the art for RGB stripe displays. Indeed, FIG. 1B in the subject application shows 1 x 2 dot inversion as applied to an RGB stripe subpixel arrangement. Therefore, a person of ordinary skill in the art does not need the teachings of Okuzono to learn about 1 x 2 dot inversion for an RGB stripe display.

Finally, the Mori disclosure recognizes the problem of horizontal striping in a display. In the discussion of FIGS. 20A, 20B and 20C, Mori states:

> In a display panel ... where rows or columns of sub-pixels of substantially equal luminances are present in succession along with another row or column of sub-pixels showing a substantially different

luminance, the luminance difference can be recognized as a color irregularity (or color line) by human eyes, thus resulting in an inferior picture quality.

FIGS. 20A and 20B respectively show a relationship of luminances for the respective columns and disposition of sub-pixels R, G and B in case where all the sub-pixels are turned on, under the condition that the sub-pixels of R, G and B show relative luminances (i.e., relative transmittances through respective color filter segments) of 20:50:10. In the illustrated arrangement, *respective rows show a repetition of brightness and darkness* (a repetition of luminance levels of 37 and 17 for FIG. 20A and a repetition of 23 and 30 for FIG. 20B) *row by row and without a succession of rows of equal brightness, so that the difference in luminance level between rows is not recognizable.* However, vertically arranged columns include a succession of columns of equal luminance (two columns of luminance of 35 in FIG. 20A and two columns of luminance of 15 in FIG. 20B), and provides a large difference in luminance from that in an adjacent column (i.e., 35-10=15 in FIG. 20A and 50-15=35 in FIG. 20B), the luminance difference can be recognized as a color irregularity (color line), thus resulting in inferior picture quality.

Mori at col. 14, line 46 and 55 – 67, and col. 15, lines 1 – 6 (emphasis added.) In effect, Mori is stating that the subpixel arrangement of FIG. 15 (as reproduced in FIG. 20A) does not produce horizontal striping.

Applicants respectfully submit that the Mori disclosure teaches that the subpixel arrangement of FIG. 15 (reproduced in FIG. 20A) does not produce horizontal striping, and so a person of ordinary skill in the art would not look to the Okuzono reference for any teachings, since the Okuzono reference is concerned with a technique for eliminating horizontal striping.

Mori goes on to say that the subpixel arrangement in FIG. 20A (also FIG. 15) may produce <u>vertical striping</u> (see Mori at col. 15, lines 6 – 14) resulting in "inferior picture quality." Mori describes a solution, in the discussion accompanying FIG. 20C at col. 15, lines 15 – 23, that involves changing the subpixel arrangement and does not involve localizing image degradation to a column of dark-colored subpixels. Mori's solution is to eliminate the vertical striping, and neither he nor Okuzono address the issue of localizing image degradation to a column of dark colored subpixels.

In view of the foregoing discussion that (1) the Examiner recognizes that Mori modified by Okuzono does not expressly disclose any image degradation of said signals being localized on specific ones of the subpixels, (2) Okuzono teaches <u>eliminating</u> horizontal striping (interpreted to be image degradation), and therefore teaches away from localizing image degradation to a specific set of subpixels, (3) Applicants' own specification teaches the well-known 1 x 2 dot inversion as applied to a standard RBG stripe display, and (4) Mori seems to provide his own solution to problems of horizontal striping by adjusting his subpixel arrangements (and not by localizing image degradation to certain ones of the subpixels), Applicants respectfully submit that the Okuzono reference is simply not a relevant teaching with respect to independent claims 1, 8 and 15 in the subject application. Put another way, a person of ordinary skill in the art would have no motivation to look to, nor would find any suggestion in, the teachings of Okuzono to apply 1 x 2 dot inversion to the (non RGB stripe) subpixel arrangement in FIG. 15 of Mori.

Assuming then that the teachings in the Okuzono reference are not relevant to Applicants' claims, the argument proposed in the Office Action, therefore, seems to be reduced to stating that applying a known 1 x 2 dot inversion scheme to the <u>odd</u>-numbered subpixel arrangement in FIG. 15 of Mori, as shown in drawing 2 of the Office Action, would result in any image degradation being localized on a column of dark colored subpixels. Applicants see no reason to speculate as to whether that is true or not, since, as already noted above, the subpixel repeating group disclosed in FIG. 15 of Mori <u>does not have an even number of subpixels</u>.

Applicants clearly point out, in the specification, the issue that arises when a subpixel repeating group comprises an even number of subpixels:

> [018] To prevent visual degradation and other problems within AMLCDs, not only must the polarity of data line transitions be randomized along each select line, but the polarity of data line transitions must also be randomized for each color and locality within the display. While this randomization occurs naturally with RGB triplet color sub-pixels in combination with commonly-used alternate column-inversion data driver systems, this is harder to accomplish when an even-number of sub-pixels are employed along row lines.

Thus, as the specification points out, the mere application of a 1 x 2 dot inversion scheme to a subpixel repeating group having an even number of subpixels in a row will not prevent visual degradation and other problems.

For the foregoing reasons, the asserted combination of Mori and Okuzono fails to address this issue, and therefore fails to state a *prima facie* case of obviousness with respect to claims 1, 8 and 15. Applicant respectfully requests that this rejection be withdrawn as to these claims.

<u>Claims 6, 13 and 20 and the combination of Mori and Okuzono.</u>

It is respectfully submitted that the Office Action fails to state a *prima facie* case of obviousness with respect to claims 6, 13 and 20 because the recited combination of Mori and Okuzono fail to teach every claim limitation in these claims.

Claim 6 is directed to a liquid crystal display comprising a panel substantially comprising a subpixel repeating group comprising an even number of subpixels in a first direction, and a driver circuit having at least two phases, the driver circuit sending image data having a polarity scheme to said panel, wherein phases of the driver circuit are selected such that any parasitic effects placed upon any subpixels are placed substantially upon a plurality of same colored subpixels.

Claim 13 is directed to a method of correcting for image degradation in liquid crystal displays comprising arranging subpixels into at least one subpixel repeating group in a panel, the subpixel repeating group comprising an even number of subpixels in a row and at least one column of blue subpixels. The method further comprises providing signals for image data having a polarity scheme to the panel with a driver circuit having at least two phases selected such that any parasitic effects placed upon any subpixels are placed substantially upon the at least one column of blue subpixels.

Claim 20 is directed to a liquid crystal display, comprising display means including a plurality of subpixels arranged in at least one subpixel repeating group, the subpixel repeating group comprising an even number of subpixels in a row and including at least one column of blue subpixels. The liquid crystal display further comprises driving means for providing signals for image data having a polarity scheme to the display means; said driving means having at least two phases selected such that any parasitic effects placed upon any subpixels are placed substantially upon the at least one column of blue subpixels.

As a preliminary matter, the discussion above with respect to the fact that Mori does not disclose a subpixel repeating group comprising an _even_ number of subpixels in a first direction applies equally to independent amended claim 6 and to claims 13 and 20.

With respect to claim 6, the Office Action first states that Mori as modified by FIG. 2 of Okuzono teaches a driver circuit having at least two phases. FIG. 2 of Okuzono appears to show the polarity scheme referred to therein as "two line dot inversion," and also referred to as 1 x 2 dot inversion in Applicants' specification. Assuming for the sake of argument herein, that Okuzono teaches a driver circuit having at least two phases because each distinct row pattern of polarity is interpreted to be a phase, the Office Action fails to state the motivation, teaching or suggestion in either Mori or Okuzono, for modifying the display taught in Mori to be driven by a driver circuit having at least two phases, as shown in FIG. 2 of Okuzono.

Mori discloses, in FIG. 25, a typical display arrangement of "a matrix of pixel electrodes 101, TFTs (thin film transistors) 102, scanning signal lines 103, data signal lines 104, a scanning signal application circuit 105 and a data signal application circuit." Mori, col. 5, lines 21 – 24. But, as the Office Action acknowledges at page 3, Mori does not discuss data signals having polarities. The Office Action provides no motivation, teaching or suggestion in either Mori or Okuzono as to why a person of ordinary skill in the art would use the teaching in Okuzono of a driver circuit having two phases to modify the operation of the display, as shown for example in FIGS. 25 and 15, of Mori. As already noted above, Okuzono's disclosure appears to be directed to the standard RGB stripe display, and FIG. 15 in Mori does not show the standard RGB stripe configuration.

The Office Action then states, at pages 5 – 6, without further explanation, that the phases of the driver circuit are selected such that any parasitic effects (caused by driving two adjacent pixels having a same color with a same polarity) placed upon any subpixels are placed substantially upon the column of blue subpixels. Note that applicants have amended claim 6 to refer to a plurality of same colored subpixels, for reasons not related to this rejection. Okuzono does not discuss the reasons for using two line or three line dot inversion. Rather, Okusono focuses on how to modify the scan line timing to eliminate horizontal striping using either type of polarity scheme; Okuzono's scan line timing technique can be designed to apply to the particular polarity scheme being used by the display. See, for example, the various embodiments in Okuzono that are specifically described with respect to two-line and three-line inversion.

Moreover, since Okuzono is interested in eliminating horizontal striping (i.e., image degradation) and makes no mention of modifying the polarity scheme to accomplish that goal, it would appear that Okuzono is silent or neutral as to how the phases of the driver circuit are selected. That is, a person of ordinary skill in the art will not learn from the Okuzono disclosure how to select the phases of the driver circuit such that any parasitic effects placed upon any subpixels are placed substantially upon the same colored subpixels. It is respectfully submitted that

Okuzono simply does not supply such a teaching, and the Office Action is silent as to what other reference might provide this teaching.

Claim 13 also includes a limitation that refers to a driving circuit having at least two phases. In claim 13, the limitation requires that the phases be selected such that any parasitic effects placed upon any subpixels are placed substantially upon at least one column of blue subpixels. The reasons just stated with respect to the teachings of Okuzono as applied to claim 6 apply equally to the limitation in claim 13: Okuzono is silent or neutral as to how the phases of the driver circuit are selected, and so a person of ordinary skill in the art will not learn from the Okuzono disclosure how to select the phases of the driver circuit such that any parasitic effects placed upon any subpixels are placed substantially upon a column of blue colored subpixels.

Claim 20 includes a limitation that refers to driving means having at least two phases. In claim 20, the limitation requires that the phases be selected such that any parasitic effects placed upon any subpixels are placed substantially upon at least one column of blue subpixels. The reasons just stated with respect to the teachings of Okuzono as applied to claims 6 and 13 apply equally to the limitation in claim 20: Okuzono is silent or neutral as to how the phases of the driving means are selected, and so a person of ordinary skill in the art will not learn from the Okuzono disclosure how to select the phases of the driving means such that any parasitic effects placed upon any subpixels are placed substantially upon a column of blue colored subpixels.

For the foregoing reasons, the asserted combination of Mori and Okuzono fails to state a *prima facie* case of obviousness with respect to claims 6, 13 and 20. Applicant respectfully requests that this rejection be withdrawn as to these claims.

<u>New Claim 27 and the combination of Mori and Okuzono.</u>

Newly added claim 27 is directed to method of correcting for image degradation in liquid crystal displays comprising providing signals indicating image

data to a plurality of subpixels in a display panel using a driver circuit having at least two phases. The plurality of subpixels are arranged in at least one subpixel repeating group including an even number of subpixels in a row. The signals indicating the image data further implement a polarity scheme for the subpixels. The method further comprises configuring the phases of the driver circuit in order to localize any image degradation introduced by the signals to a plurality of same colored subpixels.

Applicants respectfully submit that newly added claim 27 is patentable over the combination of Mori and Okuzono for the reasons given above with respect to independent claims 1, 6, 13 and 20.

Claim Rejections under 35 U.S.C. § 103(a): Mori, Okuzono and Martin

The Office Action rejects claims 3, 4, 10, 11, 17, and 18 under 35 U.S.C. 103 (a) as being unpatentable over Mori and Okuzono as applied to claim 1 above, and further in view of Martin et al., US 6,714,206.

Dependent claims 3, 10 and 17.

The Office Action states that, since the subpixel arrangement in FIG. 15 of Mori does not expressly disclose a checkerboard of red and green subpixels, it would have been obvious to a person of ordinary skill in the art at the time of the invention to adopt Martin's red and green subpixel arrangement in Mori's subpixel arrangement of FIG. 15 to teach the claim limitation of claims 3, 10 and 17.

As a preliminary matter, Applicants point out that the subpixel arrangement disclosed in Martin was disclosed prior to the filing date of the Martin reference in US Patent Application Nos. 09/629,122, filed on 07/28/2000, and 09/916,232 filed on 07/25/2001, now issued as 6,903,754, which are referenced in the subject application as being commonly-owned with the subject application.

Modifying the subpixel arrangement of FIG. 15 of Mori, as shown in drawing 1 of the Office Action would presumably result in the subpixel arrangement of

B	G	G	B
B	R	R	B

being modified to look like:

B	R	G	B
B	G	R	B.

The motivation given for modifying the subpixel layout of FIG. 15 in Mori using the teaching in Martin is "to provide a uniform color illumination by placing two subpixels of two different pixels having different colors in each row." (Office Action at page 7.) The Martin reference, however, is concerned with techniques for implementing a dithering system, and provides no such teaching, suggestion or motivation with respect to modifying the subpixel arrangement in FIG. 15 in Mori. Applicant respectfully submits that the Examiner is inventing a rationale for making the asserted combination, and no such teaching, suggestion or motivation for making the asserted combination is found in any of the Mori, Okuzono or Martin references.

Dependent claims 4, 11 and 18.

The Office Action references Figure 9 of Okuzono as teaching the limitation of claims 4, 11 and 18 "wherein the two columns of blue subpixels share a same column driver." Applicants respectfully disagree. The Examiner may interpret claim language broadly, but must interpret it in a manner that a person of ordinary skill in the art would understand. Applicants suggest that the Examiner's interpretation of the source driver of FIGS. 1 or 9 of Okuzono would not be interpreted to be a "column driver" by a person of ordinary skill in the art.

Okuzono's Fig. 9 is referenced briefly in the Background of the disclosure as showing "the structure of essential sections of a liquid crystal display according to related art." This description, however, describes "a source driver 106, by supplying a write voltage to the drain line 103, conducts writing to each of the liquid crystal cells 101 via the TFT 100 driven by the gate driver 105" without discussing the

structure of source driver 106. The Office Action is interpreting source driver 106 as being "the same column driver" shared by two columns of blue subpixels. While it is true that source driver 106 is common to all drain lines 103 on the display, Applicants respectfully submit that a person of ordinary skill in the art would not interpret source driver 106 as a "column driver."

The internal structure of source driver 106 is not discussed in relationship to Figure 9. However, Okuzono describes the source driver in more detail in FIG. 1, at columns 6 and 7. In particular, Okuzono states,

> FIG. 1 is a block diagram showing the construction of essential sections of a liquid crystal display according to the first embodiment of the present invention. ...

> Of these, each of the gate lines corresponds with a respective scan line. Furthermore, the image data for performing screen display on the liquid crystal panel 1 is supplied to the drain lines 3. Consequently, *the drain lines 3 are sometimes also called data lines. Pixels are arranged in a matrix at those positions where the gate lines and the data lines intersect.*

> ... In addition to performing the display of one dot, the liquid crystal cell 5 also comprises the capacity for holding a write voltage supplied from a source driver 9 (to be described below) through the drain line 3.

> ...

> Next, the timing controller 8 generates a dot clock signal DCK, a latch pulse signal STB, the clock signal VCK, the output enable signal/VOE and the image data, and by outputting each of these to the gate driver 7 and the source driver 9, controls the image display on the liquid crystal panel 1. ...

> *The source driver 9 incorporates a shift register, a latch and a driver circuit (none of which are shown in the figure).* Moreover, all of these are designed to correspond with one scan line worth of image

data (in this case 1280 dots). Based on a start pulse signal SP and the dot clock signal DCK supplied from the timing controller 8, the source driver 9 takes in the image data sequentially into the shift register pixel by pixel and in accordance with the dot clock signal DCK from the point in time where the start pulse signal SP rises.

The source driver 9 halts the intake of data into the shift register at the point in time where image data on one scan line has been received. Furthermore, in the case where the pulse of the latch pulse signal STB has been supplied to the source driver 9 from the timing controller 8, all the image data taken in by the shift register is transferred simultaneously to the latch, synchronized with the rise of the pulse. In addition, *the source driver 9, synchronized with the fall in the latch pulse signal STB, converts the image data transferred to the latch to a write voltage for the liquid crystal cell 5 and simultaneously sends this voltage to the drain line 3.*

Okuzono, col. 6, lines 17 – 19, 23 – 29, 36 – 39, and col. 7, lines 34 – 62 emphasis added.) Image data for forming the image on liquid crystal display panel 1 is sent to the pixels arranged in the matrix at those positions where the gate lines and the data lines intersect. The image data for performing screen display on the liquid crystal panel 1 is supplied to the drain lines 3. It would simply make no sense for source driver 9 to be a "column driver" commonly shared by all of the columns of pixels on the display, since the image data may be different for each pixel in each column. Thus, the internal structure of source driver 9, i.e., a shift register, a latch and a driver circuit (none of which are shown in the figure) control the supply of signals to drain (data) lines 3.

Applicants respectfully submit that a person of ordinary skill in the art would understand that, in either FIG. 1 or FIG. 9 of Okuzono, none of the drain (or column or data) lines <u>shares</u> a column driver with another drain line in source driver 9. Okuzono does not show, in either source driver 9 (FIG. 1) or source driver 106 (FIG. 9), a column driver providing signals to <u>two</u> columns of TFTs. Therefore, without

further illustration of the internal structure of source drivers 9 and 106, a person of ordinary skill in the art would conclude that Okuzono does not teach two columns of blue subpixels sharing a same column driver.

For the foregoing reasons, the asserted combination of Mori, Okuzono and Martin fails to state a *prima facie* case of obviousness with respect to claims 3, 4, 10, 11, 17, and 18. Applicant respectfully requests that this rejection be withdrawn as to these claims.

Claim Rejections under 35 U.S.C. § 103(a): Mori, Okuzono and Nakano

Claim 5, 7, 12, 14, 19, and 21 are rejected in the Office Action under 35 U.S.C. 103 (a) as being unpatentable over the combination of Mori as modified by Okuzono, and further in view of Nakano et al., US Patent Application Publication 2001/0052897.

The Examiner cites Nakano for teaching the principle of applying a correction signal to subpixels (presumably in the display of FIG. 15 in Mori) to adjust or compensate the offset that occurs among three subpixels with different colors when a gray scale level of any 6-bit data is applied to the subpixels, referring to Fig. 2 and paragraph 0041 of Nakano.

Nakano discloses a column electrode driver circuit for an image display device for selecting reference voltage levels respectively corresponding to gray scale levels in input data. (Abstract). Nakano corrects relative luminance differences between the subpixels, as stated in paragraph [0029]: "[a]s a result, the unwanted variation in chromaticity associated with changes in gray scale levels can be minimized."

The Office Action then states that "it would have been obvious to one of ordinary skill in the art at the time of the invention to include Nakano's method / principle of applying correction signals to the subpixels which have relatively low luminance values in Ikeda, in order to equalize the luminance value of a subpixel with a color with the luminance value of another subpixel with a different color, thus

to provide an image with more precise brightness for the display." Office Action at page 8 – 9.

First, applicants point out that the Ikeda reference has not been cited as part of the rejection under 35 U.S.C. § 103. Presumably, the Office Action intended to refer to Mori.

Secondly, Applicant respectfully submits that the Examiner statement with respect to the motivation for applying the correction technique in Nakano to the display in Mori is merely a conclusion that fails to indicate which reference provides the motivation, suggestion or teaching to make the asserted combination.

For the foregoing reasons, the asserted combination of Mori, Okuzono and Nakano fails to state a *prima facie* case of obviousness with respect to claims 5, 7, 12, 14, 19, 21. Applicant respectfully requests that this rejection be withdrawn as to these claims.

In any event, dependent claims 5, 7, 12, 14, 19, 21 include the limitations of and depend from now presumably allowable claims 1, 6, 8, 13, 15 and 20 and so are believed to be in condition for allowance, without regard to the teachings of the Nakano reference.

Conclusion

In summary, for all of the foregoing reasons, it is believed that the Office Action fails to state a *prima facie* case of obviousness with respect to independent claims 1, 6, 8, 13, 15, 20 and new independent claim 27. Applicants request that the rejections be withdrawn.

In addition, claims 1, 6, 8, 13, 15, 20 are patentably distinct over and are not obvious in view of the Mori, Okuzono, Martin and Nakano disclosures, and are believed to be in condition for allowance, Insofar as claims 2-5, 7, 9-12, 14, 16-19, 21 and new claims 22-26 are concerned, these claims include the limitations of and depend from now presumably allowable claims 1, 6, 8, 13, 15 and 20, and so are also believed to be in condition for allowance.

Applicant therefore respectfully submits that all pending Claims are patentable over the cited art of record and are in condition for allowance. Therefore, Applicant requests the Examiner to reconsider and withdraw the outstanding rejections and pass this application to allowance.

If the Examiner believes a telephone conference would expedite the allowance of the claims, the Examiner is invited to contact Judith C. Bares at (707) 824-2486.

Respectfully submitted,

_____ /Judith C. Bares/_____

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Dated: ____August 4, 2006_____

Attachment: Replacement Sheet showing FIG. 2.